United States Department of Agriculture
NRCS Natural Resources Conservation Service

Wetland Creation/ Enhancement – 658/ 659

Conservation Practice Specification August, 2011

Purpose

The purpose of this practice is the modification of the hydrologic condition, hydrophytic plant communities, and physical habitat components of a wetland for the purpose of favoring specific wetland functions or values.

General

- Wetland Enhancement or Wetland Creation shall be planned and installed in accordance with the Field Office Technical Guide (FOTG), Section IV− Practice Standard. This document provides additional parameters, references, recommendations, and requirements for developing site-specific plans for this practice. This document is not a construction specification and cannot be utilized as such. Structural companion practices will have stand-alone construction specifications.
- Wetlands may be permanent or seasonal depending on the objectives of the development.
- Shallow water developments can be excavated by bulldozer, dragline or even land-scraper, by creating hollows and mounds. De-leveling uniform grade areas to collect water in depressions is an effective technique. The existing ground relief can be identified and incorporated into the design to create opportunities for pool bottom diversity. Complete NRCS AK Wetland Practices Planning Worksheet for all projects.
- Identify the species to be attracted or provided for. Contact a local area biologist or the NRCS State Biologist to identify draw down and reflooding options for your area of the state if this feature is part of the project intent.
- Embankment ponds can be effective shallow water areas when designed to allow draw-downs and water level management. Embankment ponds shall be designed according to the Pond Practice Standard 372.
- Off-channel floodplain sites, where intended to over-winter or provide high-water sheltering conditions, or which might participate in unintended high-water events must insure hydrologic connection to provide fish passage where resident or anadromous fish populations are identified. Aquatic corridors/connections must have channel depths equal to streambed depths. Stability of connecting areas and corridors will be insured to prevent avulsion or destruction which might entrain aquatic species.

Construction

- Scrape and stock pile topsoil and surface organic matter. Spread this source of vegetative seed bank up to 4” thick, on excavated areas in the pool which will be intermittently exposed to provide a seed source for vegetative re-sprouting.
- Excavated unused spoil will be spread on uplands in a manner that will not impede surface water from entering the pool area nor violate wetland regulations.
- Impoundments with berm heights over 3.5 ft. will contain a mechanical structure, such as a drop pipe, which will be installed to allow water level manipulation over the course of the

season, and which will include the ability to completely dewater the impoundment for management purposes.

- Shorelines will be irregular in shape appropriate to the landscape and topography. Side-slopes shall range from 9:1 to 20:1 at water surface/ bank interface along ≥80% of the impoundment/ excavation perimeter.
- Open water developments shall have a minimum of three distinct zones of water depths. The table below identifies three scenarios that maximize habitat for different species.

DEPTH SCENARIOS	1"– 6"	6"–18"	18"-36"	36"-72"
A	65%	25%	10%	
B	40%	30%	20%	10%
C	20%	20%	30%	30%

Scenario Descriptions

A – Projects which favor shorebirds (including cranes) over waterfowl and other species.

B – Projects which favor shorebirds, wood-frog and dabbling ducks over diving ducks and other species.

C - Projects which favor diving ducks, furbearers, fish and other species over shorebirds.

Islands

- Nesting islands will be located a minimum of 200' from the nearest shoreline. This requires at least a minimum 1 acre shallow water site in most cases.
- Multiple islands must be separated by at least 200'.
- Islands (minimum 375 sq. ft.) shall have irregular oval or kidney shaped shorelines with the long axis of islands parallel to prevailing winds. Islands will be at least 25' in length and be located in 3'-5' feet of water. Islands will have approximately 60% of shoreline slopes to the water no less than 10:1 (6:1-8:1 on waters with high potential wave action and more than 400' of fetch); Island top widths will be a minimum of 15' with a rise of 3'-4' above high water mark. Except for shoreline, the overall island slope may be as steep as 4:1.
- Islands must provide vegetative cover for the identified species. Shrub and/ or tree overstory with grass-forb ground cover maximizes attraction diversity. If waterfowl species and shorebirds are the primary focus, keep woody plants confined and dense to one area of the island.
- Do not install trees on new islands less than .3 acre in size, unless identified as a life requisite for the focus wildlife species.

Dugouts

Wetland dugouts may be used to enhance wetlands. A wetland dugout is a constructed shallow depression area. Side slopes shall be shaped to a stable grade (see table above). All excavated material shall be spread on non-wetland sites, or will be hauled off-site unless conditional permit allowances are made by regulatory agencies. No spoil will be allowed in any drainage path.

Potholes may be enhanced through blasting, excavation, or by restoring the hydrology to existing depression areas. Blasting is to be done by only experienced personnel in accordance with federal, state, and local regulations.

Grade Stabilization Structure/ Structure For Water Control

Any grade stabilization structures or water control structures necessary to facilitate completion of this practice shall be designed in accordance with PS-410 Grade Stabilization Structure, PS-587 Structure for Water Control, or other applicable NRCS practice standards.

Vegetation

- Allow deadfall to remain inside and adjacent to the pool area. However, monitor water control devices to insure they are not blocked by woody material.
- On some project sites it may be necessary to control cattail (typha latifolia) plant communities

or other invasive persistent hydrophytes. Cattails can produce seed and contribute to the seedbank at all marsh stages, but recruitment only occurs during the dry stage. Light in combination with other environmental factors, is critical to germination of seeds. Management of the shallow water site may either foster or inhibit germination of the seedbank. Flooding areas with a 1" or greater water depth essentially prevents germination. If reduction of cattail or bulrush production is a management goal reduce adjacent sites potential for colonization on areas of moist soil mudflats by increasing water levels during seed germinating periods, or by other mechanical or chemical means according to manufacturers labels.

- Grazing, mowing, burning and/or discing disturbances may be used in conjunction, with flooding to insure anaerobic conditions, during cattail/ bulrush shoot formation (primarily warmer late spring and summer conditions in Alaska). Late fall burning and discing must be accompanied by spring flooding above any standing cattail shoots to retard cattail/ bulrush production. With spring cattail/ bulrush shoots and leaf presence, flood the site to a minimum of 3' above standing material.
- Maintain sites with natural woody (willow/ alder) communities to facilitate use by herons as well as Neotropical migrants. Maintain all woody plants and tall overstory trees and shrubs on peripheral water edges to facilitate nesting and rearing areas for wetland avian arboreal species. However, when waterfowl and shorebird nesting benefits are being optimized, remove standing dead snags or other "perch trees" which would encourage use by raptors or other predaceous birds.
- Project sites adjacent to croplands can be planted to annual small grains to improve migratory waterfowl feeding opportunities. Insure state and federal regulations are observed related to baiting.
- Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) shall be implemented where available and feasible. To encourage muskrat populations to assist in vegetative control maintain water depths in excess of 4.5 feet through the winter period.
- Waterfowl plant foods should normally be allowed to develop naturally on most sites. This helps insure native plants adapted to local conditions form normal ecological associations. Obtain local adapted wetland plant food lists from ADF&G or USFWS if required. Table 1 lists common plants found in Alaska permanent and semi-permanent marsh sites.

Table 1

Waterfowl Plant Foods

Grass and Grasslike	
Burreeds	*Sparganium spp.*
Wigeon grass	*Rupia maritima*
Seaside arrowgrass	*Triglochin maritimum*
Marsh arrowgrass	*Triglochin palustre*
Soft-stem bulrush	*Scirpus validus*
Saltmarsh bulrush	*Scirpus maritimus*
Olney's bulrush	*Scirpus americanus*
Sedge's	*Carex spp.*
Spikerush's	*Eleochris spp.*
American sloughgrass	Beckmania syzigachne
Nodding beggar's tick	*Bidens cernua*
Forbs and Aquatics	
Common duckweed	*Lemna minor*
Star duckweed	*Lemna triscula*
Water smartweed	*Polygonum amphibium*
Ladysthumb	*Polygonum persicaria*
Pennsylvania smartweed	*Polygonum. pennsylvanicum*
Dock's	*Rumex spp.*
Northern arrowhead	*Sagitaria cuneata*
Sago pondweed	*Potomageton pectinatus*

PLANS AND SPECIFICATIONS

Site specific specification for this practice will be prepared. Specifications shall be recorded using

approved specification sheets, job sheets, narrative statements in the conservation plan, or other documentations.

Operation and Maintenance

- Waterfowl and shorebirds benefit most when water levels are increased and withdrawn gradually. This allows vegetative material decomposition to proceed at maximum rates for the site and encourages invertebrate communities, microbes and phytoplankton to respond accordingly. Some specific management goals may sometime require immediate draw downs or refills. However, for waterfowl and shorebird habitat and migration, gradual filling and draw down is best.
- For water-controlled systems, in spring slowly flood in 4" increments over 7 day cycles, after filling to mid-pool depths.
- Generally for shorebirds, draw down slowly over the course of fall migration, exposing moist soil and mud flats for probing and wading birds
- For ducks in water-controlled impoundments, maintain normal water levels drawing down to 12" -20" approximately the 10th of September.
- Moist-soil management systems generally require designed excavations/ impoundments with a functional water control and drain structure and supplemental water availability.

  Timing and frequency of drawdowns will manipulate soil microbes, invertebrates, vegetation and other system features and participants. Refer to Table 2 for guidelines.
- Late season drawdowns generally favor grasses and other short-lived annuals. Total seed production from all plant species is usually greater when impoundments are drained in early to mid growing season. Maximum desirable seed production from native plants occurs when plant communities are maintained in early successional stages.
- To encourage muskrat populations to assist in vegetative control maintain water depths in excess of 4.5 feet through the winter period.
- In unmanaged systems where water is only naturally seasonally available from runoff or ground water levels, manipulation may not be feasible and is not required.
- Structures built to modify the wetland will be inspected each year for the life of the practice. Water control structures will be inspected for wear and damage so that the designed amount of water is retained in the wetland and/or delivered to the wetland. Embankments must maintain designed water levels without leakage. Requirements for the operation and maintenance of the practice shall be incorporated into site specifications.

Table 2

. Comparison of plant, invertebrate, bird and abiotic responses to rate and date of drawdown among wet and

	Drawdown Rate	
	Fast[a]	Slow[b]
Plants		
Germination period of ideal conditions	short	long
Root development		
Wet year	good	excellent
Dry Year	poor	excellent
Seed production		
Early season	good	excellent
Late season	not recom	excellent
Wet year	good	good
Drought year	poor	good
Invertebrates		
Availability		
Early season	good	excellent
Late season	poor	good
Period of availability	short	long
Bird use		
Early season	good	excellent
Late season	poor	good
Nutrient export	high	low
Reducing soils salinites	good	poor

[a] Less than 4 days

[b] Greater than 2 weeks

Waterfowl Management Handbook, 13.4.6, 1991

- Maximum diversity and number of birds occurs when vegetation cover and water interspersion is at a 50:50 ratio in a permanent/ semi-permanent marsh condition. This condition provides ideal nesting cover for waterbirds as well as substrates and litter for invertebrate populations.
- Manipulation through drying, discing, roto-tilling or burning and reflooding every 3-4 years will reinstate early successional vegetative conditions and maximize seed availability and invertebrate production. Annual disturbance is not recommended as it does not allow the site to cycle through all important life cycles. Annual disturbances have the potential to reduce beneficial plant communities and encourage undesirable monocultures.
- Monitor sites for specific plant communities to determine when appropriate disturbances are necessary to maintain high quality waterfowl habitat.
- Evaluate project success through visual observations and annual documentation during seasonal use stages for species of planned interest and other incidental species use. Begin evaluations 12 months from final installation.

REFERENCES

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